Health Consultation

Technical Document Review
Remedial Investigation/Feasibility Study Management Plans
Former Rayonier Mill Site — Uplands Area
(a/k/a Rayonier Mill)
Port Angeles, Clallam County, Washington
EPA Facility ID: WAD000490169

July 21, 2003

Prepared by

The Washington State Department of Health
Under a Cooperative Agreement with the
Agency for Toxic Substances and Disease Registry

Washington State Department of Health

Foreword

The Washington State Department of Health (DOH) has prepared this health consultation in cooperation with the Agency for Toxic Substances and Disease Registry (ATSDR). ATSDR, part of the U.S. Department of Health and Human Services, is the principal federal public health agency responsible for health issues related to hazardous waste. This health consultation was prepared in accordance with methodologies and guidelines developed by ATSDR.

The purpose of this health consultation is to identify and prevent harmful human health effects resulting from exposure to hazardous substances in the environment. Health consultations focus on specific health issues so that DOH can respond to requests from concerned residents or agencies for health information on hazardous substances. DOH evaluates sampling data collected from a hazardous waste site, determines whether exposures have occurred or could occur, reports any potential harmful effects, and recommends actions to protect public health. The findings in this report are relevant to conditions at the site during the time of this health consultation, and should not necessarily be relied upon if site conditions or land use changes in the future.

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Glossary

Acute	Occurring over a short time [compare with **chronic**].
Agency for Toxic Substances and Disease Registry (ATSDR)	The principal federal public health agency involved with hazardous waste issues, responsible for preventing or reducing the harmful effects of exposure to hazardous substances on human health and quality of life. ATSDR is part of the U.S. Department of Health and Human Services.
Aquifer	An underground formation composed of materials such as sand, soil, or gravel that can store and/or supply groundwater to wells and springs.
Chronic	Occurring over a long time (more than 1 year) [compare with **acute**].
Contaminant	A substance that is either present in an environment where it does not belong or is present at levels that might cause harmful (adverse) health effects.
Dermal Contact	Referring to the skin. For example, dermal absorption means passing through the skin.
Exposure	Contact with a substance by swallowing, breathing, or touching the skin or eyes. Exposure may be short-term [**acute exposure**], of intermediate duration, or long-term [**chronic exposure**].
Groundwater	Water beneath the earth's surface in the spaces between soil particles and between rock surfaces [compare with **surface water**].

Hazardous substance	Any material that poses a threat to public health and/or the environment. Typical hazardous substances are materials that are toxic, corrosive, ignitable, explosive, or chemically reactive.
Ingestion	The act of swallowing something through eating, drinking, or mouthing objects. A hazardous substance can enter the body this way [see **route of exposure**].
Inhalation	The act of breathing. A hazardous substance can enter the body this way [see **route of exposure**].
Media	Soil, water, air, plants, animals, or any other part of the environment that can contain contaminants.
Model Toxics Control Act (MTCA)	The hazardous waste cleanup law for Washington State.
Monitoring wells	Special wells drilled at locations on or off a hazardous waste site so water can be sampled at selected depths and studied to determine the movement of groundwater and the amount, distribution, and type of contaminant.
Organic	Compounds composed of carbon, including materials such as solvents, oils, and pesticides which are not easily dissolved in water.
Plume	A volume of a substance that moves from its source to places farther away from the source. Plumes can be described by the volume of air or water they occupy and the direction they move. For example, a plume can be a column of smoke from a chimney or a substance moving with groundwater.
Remedial investigation	The CERCLA process of determining the type and extent of hazardous material contamination at a site.

Route of exposure	The way people come into contact with a hazardous substance. Three routes of exposure are breathing [**inhalation**], eating or drinking [**ingestion**], or contact with the skin [**dermal contact**].
Surface Water	Water on the surface of the earth, such as in lakes, rivers, streams, ponds, and springs [compare with **groundwater**].
US Environmental Protection Agency (EPA)	Established in 1970 to bring together parts of various government agencies involved with the control of pollution.
Volatile organic compound (VOC)	An organic (carbon-containing) compound that evaporates (volatilizes) easily at room temperature. A significant number of the VOCs are commonly used as solvents.

Background and Statement of Issues

The Washington State Department of Health (DOH) has prepared this health consultation in response to a request from the Washington State Department of Ecology (Ecology) to conduct a technical review of the Rayonier, Inc. (Rayonier), *Management Plans for the Remedial Investigation-Feasibility Study of the Uplands Environment, Former Rayonier Pulp Mill, Port Angeles, Washington*.[1] The management plans include a work plan, a sampling and analysis plan (SAP), and a quality assurance project plan (QAPP).

The former Rayonier pulp mill is located at 700 North Ennis Street, on the northern edge of downtown Port Angeles. The mill property consists of approximately 80 acres, including submerged land in the southeastern portion of Port Angeles Harbor, adjacent to the Strait of Juan de Fuca, along the northern coast of the Olympic Peninsula. The pulp mill operated between 1930 and 1997, using an acid sulfite and bleaching process to produce acetate, specialty paper, fluff, and viscose grade pulps from wood chips. Most of the facility has been dismantled since its closure.[1]

A significant portion of the upland area of the mill site is underlain by fill. Fill materials, which have been characterized as "highly variable", include sand, silt, and gravel; wood waste; ash; and demolition debris (e.g., brick, metal, concrete, and wood).[1] These fill materials are potentially contaminated, particularly the ash, which may contain elevated levels of dioxins. Accidental spills and leaks of chemicals to soil and groundwater occurred while the facility was in operation. Petroleum, boiler ash, and dry and liquid chemicals are some of the released substances.[2]

A number of environmental investigations have been conducted at the mill site. Dioxins, furans, petroleum and some of its constituents (e.g., polynuclear aromatic hydrocarbons (PAHs), benzene, ethylbenzene, toluene, and xylene), polychlorinated biphenyls (PCBs), solvents, and metals were some of the chemicals detected in soil, groundwater, and sediment during these investigations.[2]

Groundwater is not currently being used as a drinking water source but discharges to surface water (Ennis Creek and the Port Angeles Harbor), where biota is being harvested by recreational and subsistence fishermen.

Ecology provided a draft version of the management plans to DOH and other agencies (Regulatory Technical Advisory Group (RTAG)) for expedited review on February 14, 2003. Expedited review was requested because the mill site is being considered for disposal of a large volume of soil to be excavated from a graving yard project proposed by the Washington Department of Transportation and the Port of Port Angeles along the southern shore of Port Angeles Harbor. Excavation work is anticipated to begin during Summer 2003, with delivery of the soil to a disposal site in August 2003. Rayonier and Ecology are considering the former Rayonier Mill site as a possible location for the excavated soil.[3]

DOH identified some concerns about the upland work plan during its preliminary review of the February 2003 draft management plans. These concerns were verbally conveyed to Ecology and Rayonier in late February 2003. A public comment version of the management plans was provided to DOH in April 2003. Additional concerns about the management plans were verbally conveyed to Ecology on May 12, 2003.

Discussion

The April 2003 management plans for the upland remedial investigation-feasibility study (RI-FS) describes work that will be done to characterize upland contamination and conduct a feasibility study for the former Rayonier Mill site. In general, the document proposes good steps for continuing to characterize the upland contamination, identify cleanup standards, and develop cleanup alternatives for the mill site. The items, below, summarize DOH's concerns about the proposed plans along with recommendations. General comments are followed by specific comments:

General

1. The Model Toxics Control Act (MTCA) cleanup levels for the ingestion pathway were used for screening existing site data to identify chemicals of potential concern (COPCs) for soils. Although it is important to consider the ingestion pathway when identifying COPCs for soils, it is not the only pathway of concern for this site. Dermal contact with soil contaminants and inhalation of contaminants in fugitive dust is also possible and should be evaluated as part of the RI. Soil cleanup levels should also incorporate consideration of protection of groundwater, which discharges to surface water where biota are harvested for consumption by recreational and subsistence fishermen.

   Because only one pathway was considered when identifying soil COPCs, DOH cannot determine if the sampling locations and analyses proposed in the management plans are adequate for determining the nature and extent of contamination and assessing risks to human health.

   Recommendation: All potential exposure pathways for soils (surface and subsurface) should be considered when screening data to identify COPCs and determine where samples should be collected and the type of chemical analyses to be conducted.

2. Surface soil samples proposed to be collected during the RI will be used to supplement surface soil data from the 1998 Environmental Protection Agency (EPA) site investigation. However, many of the EPA surface soil samples were collected and composited over long sample intervals (e.g., 0 to 2 feet). Such sample lengths are not representative of surface soil conditions and should not be used to assess human health risks associated with surface soils.

Recommendation: Soils collected from 0 to 3 inches are generally used to represent surface soil conditions, and samples from this depth are proposed by Rayonier for new sample locations. Areas of the site where EPA collected surface soil samples at depths greater than 3 inches should be resampled in order to provide data relevant for assessing direct contact exposure to contaminants in surface soil.

3. Composite subsurface soil samples will be collected from the bottom of the surface soil sample interval (3" below ground surface (bgs)) to the top of the groundwater table, typically 6 to 8 feet bgs. In some cases, these proposed samples will be almost 15 feet in length. Such long sample intervals are inappropriate for evaluating the nature and extent of subsurface contamination and for evaluating potential health risks.

   Recommendation: Standard subsurface soil sample lengths (e.g., 18-inches) that are representative of the length obtained from typical soil sampling devices (e.g., split spoon and Dames & Moore sampler) should be collected at an appropriate frequency at each boring to determine the nature and extent of subsurface soil contamination. Sampling below the water table may be necessary to determine the vertical extent of contamination. Samples for volatile organic compounds (VOCs), gasoline range hydrocarbons, and other volatile constituents should not be composited.

4. The management plans are unclear about additional sediment sampling requirements in Ennis Creek. Historically, only one sediment sample has been collected upstream of the Ennis Creek interim actions, at a distance of approximately 800 feet where groundwater and surface water from the mill property likely discharge to the creek. The work plan indicates that previous investigations and remedial actions in Ennis Creek generated enough data to permit adequate characterization of freshwater sediment quality (Section 4.2.3 Ennis Creek Sediments), a characterization that in turn will be used to characterize potential risks to human health. The SAP indicates that one additional sediment sample will be collected upstream of the Ennis Creek interim action.

   Recommendation: Given that on-site groundwater and surface water runoff are likely discharging to Ennis Creek, at least two additional sediment samples should be collected in the stretch of Ennis Creek upstream of the interim action area, in areas where the creek could be receiving contaminated groundwater or surface discharges from the site.

5. According to the groundwater information provided in the work plan, site groundwater flows into Port Angeles Harbor and also likely flows into Ennis Creek. However, no surface water sampling is proposed for the harbor or the creek. This is a significant data gap.

   Recommendation: Surface water samples should be collected in the adjacent harbor and from Ennis Creek concurrent with the groundwater sampling to accommodate evaluation of the potential effect of contaminated groundwater on surface water quality.

6. No reporting limits are provided in any of the sampling and analysis plan (SAP) data summary tables for non-detected results for the various media. Reporting limits are important when one is considering whether an individual chemical or chemical mixture (e.g., petroleum, PCBs, PAHs, and dioxins/furans at the Rayonier Mill) likely pose a health risk.

   Recommendation: Half of the reporting limit should be used for those chemicals that are likely site contaminants when COPCs are selected. Data summary tables in the upcoming RI report should include reporting limits for non-detected results for all site data (i.e., data collected by EPA and Rayonier that are being used to make site characterization and cleanup decisions).

Work Plan

1. **Section 2.2.6.1 Upland Environment** - The upland environment includes Ennis Creek. However, there is no discussion about the biota that inhabit the creek or about current or future biota harvesting in the creek. Consequently, it cannot be determined whether ingestion of freshwater species is a potential human exposure pathway needing evaluation during the RI.

   Recommendation: Rayonier should identify biota that inhabit the creek as well as describe any current or future recreational, commercial, or subsistence harvesting of freshwater species. Appropriate biota sampling should be conducted during the RI if this is a current or future human exposure pathway.

2. **Section 3.2.1, Soils** - Because none of the reporting limits for non-detected analytical results for soils are provided in the work plan, DOH cannot determine whether the findings discussed in this section of the work plan, which includes identification of chemicals of potential concern (COPC), are reasonable.

   Recommendation: The complete historic soil analytical database, including non-detected results (i.e., PQLs), should be provided in an appendix to the RI report as supporting documentation for the sampling.

3. **Section 4.2.1 Soil** - There is no information provided in the work plan to indicate whether there are any potential human receptors in the undeveloped portions of the site, which includes the east bluff, west bluff, Ennis Creek, and the site entrance woodland where contaminated airborne particulates from the site may have been deposited.

   Recommendation: Potential human exposures in these undeveloped areas of the site should be evaluated and appropriate soil sampling should be conducted during the RI if soils in these areas pose a potential current and future human health risk.

4. **Section 4.2.2 Groundwater** - The characteristics and quality of the shallow groundwater aquifer (fill and alluvial) will be investigated during the RI. No plans are proposed for characterizing the underlying till unit, which is likely acting as an aquitard, or other aquifers and aquitards. This is a data gap that will require investigation if contaminants are detected in the shallow aquifer at levels that pose a health threat.

   Recommendation: Additional hydrogeological characterization and monitoring should be conducted in a second phase of the RI if contaminants are detected in the shallow aquifer (fill and alluvial) at levels that pose a potential health risk.

5. **Section 4.2.2.2 EPA Requirements for Usability** - Twenty existing monitoring wells are proposed for sampling during the upcoming investigation. A number of these wells are located near the Port Angeles Harbor shoreline and likely will provide good information about groundwater quality before it discharges to surface water. However, it is possible that some of these wells, because of their proximity to the shoreline, may actually represent a zone that is affected by surface water, a possibility that could result in an underestimation of groundwater contaminants migrating from the site.

   Recommendation: Conductivity and/or salinity measurements should be taken during high and low tides to determine whether the shoreline wells are representative of groundwater leaving the site. If they are not representative, additional monitoring wells should be installed further inland.

6. **Section 4.2.2.2 EPA Requirements for Usability** - Monitoring wells MW-20 and MW-28 are shown on Figure 3-4 but not included as wells to be sampled during the RI. No rationale was provided to support this decision.

   Recommendation: Past sampling results obtained from monitoring wells MW-20 and MW-28 should be summarized in the RI report and used to support Rayonier's decision to eliminate these wells from the proposed groundwater monitoring network. It should also be noted in the RI report that monitoring well MW-11, which has been removed, contained floating petroleum in 1997. The monitoring wells that are currently being used to monitor this floating product should be identified in the upcoming RI report.

7. **Section 4.2.2.2 EPA Requirements for Usability** - No monitoring wells exist between monitoring wells MW-56 and PZ-9, a distance of approximately 1,000 feet along Port Angeles Harbor. Because groundwater discharging to surface water can affect marine biota that are being harvested by recreational and subsistence receptors, it is important that the site groundwater monitoring system provide good coverage along the shoreline.

   Recommendation: At least one additional shallow monitoring well should be installed between MW-56 and PZ-9.

8. **Section 4.2.2.2 EPA Requirements for Usability** - A number of analytical methods will be used for evaluating groundwater quality. However, no PCB or dioxin/furan analysis is proposed for groundwater, although both of these chemical groups have been detected in soils on the site. EPA analyzed PCBs during previous groundwater sampling rounds. However, the PCB detection levels were above federal aquatic standards (Table 3-5), which take in to account human consumption of aquatic organisms. Consequently, it cannot be determined whether levels of PCBs detected in groundwater pose a potential health threat. It is anticipated that groundwater dioxin/furan levels will be very low or not detected because they are hydrophobic compounds. However, these compounds can bind to fine particulates, which can be found in groundwater.

   Recommendations: It is not anticipated that PCB and dioxin/furan levels in groundwater will exceed levels of health concern. However, some groundwater samples, collected from areas where the highest concentrations are possible, should be analyzed for these compounds to confirm this assumption.

9. **Section 4.2.4.2.1 Model Selection** - It appears that the EPA-approved ISC3 model is appropriate for the proposed air modeling according to information provided in the work plan. However, DOH is relying on Ecology to verify the appropriateness of this model because air modeling is one of Ecology's areas of expertise.

   Recommendation: Ecology's Air Program or an Ecology subcontractor with air modeling expertise should be used to evaluate the appropriateness of the selected model, model input parameters, and any modeling results.

10. **Section 5.4.1.2 On-site Soils** - The work plan indicates that soil cleanup levels will be developed to protect site workers from direct contact with toxic levels of chemicals. This is appropriate if the mill property continues to be used for industrial purposes. However, if the land use were to change in the future, the soils may pose an unacceptable health risk. DOH concurs that evaluating Native American uses of the mill during the RI is also important when evaluating potential health risks posed by the site. It should be noted, however, that the soil cleanup levels may not be protective of groundwater, which discharges to surface water where recreational and subsistence fishing is occurring.

    Recommendation: Soil cleanup levels should be developed that are protective of all pathways and potential receptors.

11. **Section 5.4.1.2 On-site Soils** - No soil samples are proposed to be collected in undeveloped areas of the site (e.g., stream corridors, upland areas), which are described in Section 5.4.2.1 and appear to have a zoning designation of public buildings and parks. It is unknown whether soils in these undeveloped portions of the site, which may have been affected by air releases during the mill operation, are potential current or future exposure pathways for humans.

Recommendation: Current and future human exposures in undeveloped portions of the site should be documented and soil samples should be collected in those areas where potential or completed exposure pathways exist. A map should be included in the RI report showing all the upland zoning categories for the site.

12. **Section 5.4.1.2 On-site Soils** - The work plan states, "If a use other than industrial is identified during the RI process, then a site-specific evaluation for those areas may be performed."

    Recommendation: If contaminants are discovered in a non-industrial area of the site, then a site-specific health risk evaluation that addresses current and future non-industrial health risks needs to be conducted.

13. **Section 5.5 Remedial Investigation Report** -The purpose of the RI is to determine the nature and extent of contamination and to determine whether the site poses a threat to human health and the environment. However, it is not clear the RI report will include all the relevant data to support findings of the nature and extent of contamination at the site.

    Recommendation: The RI report should include all relevant historic data as well as the RI data that is used to determine the nature and extent of site contamination. A combination of tables, maps, and cross-sections should be used to graphically support report findings and conclusions. This presentation of site information will be important for making timely determinations about potential health risks posed by the site.

Sampling and Analysis Plan (SAP)

1. **Section 2.2 Chemical Analytes** - No volatile organic compound (VOC) analysis is proposed for soils. However, VOC analysis is proposed for all groundwater samples. Because VOCs could potentially contaminate groundwater, it is also likely that they could contaminate soils, particularly around source areas such as the automotive repair area.

    Recommendation: VOC analysis should be conducted for soil samples collected from areas such as the automotive repair area where VOC contamination is possible.

2. **Section 2.3, Sampling Locations** - Samples are proposed to be collected from areas previously not sampled by EPA (e.g., the wood mill, the roll storage area, and the spent sulfite liquor lagoon). However, no information is provided about operations or chemical use/storage at these locations. Consequently, it cannot be determined whether appropriate sampling and analysis has been proposed.

    Recommendation: Background information about the mill operations and chemical use in these areas should be provided.

3. **Section 2.3.7 Main Process Area** - Arsenic levels exceed the MTCA industrial criteria (i.e., direct contact pathway only) of 87.5 mg/kg at four surface locations sampled previously by EPA (see SAP Table 2-6). However, these areas are not identified in the SAP text or in the accompanying Figure 2-7, which incorrectly identifies the industrial land use criteria as 219 mg/kg.

   Recommendation: Areas where arsenic exceeds cleanup levels should be correctly plotted and described in the upcoming RI report. Additional sampling to identify the extent of the arsenic contamination should be conducted during the RI.

4. **Section 2.3.7 Main Process Area** - The SAP indicates that if the average arsenic level within a depth contour is greater than the MTCA industrial cleanup level for soil, the bioavailability of the arsenic will be evaluated according to the methods outlined by Ruby et al. (1996). The method was not provided in the plan, so it is unknown whether this approach will provide accurate results.

   Recommendation: The proposed bioavailability method should be provided to DOH if it is used to make RI decisions.

5. **Section 2.3.9, Background Sampling** - The proposal to collect and analyze background samples was omitted from this version of the SAP. Background samples are particularly important when evaluating whether the former Rayonier Mill operation released dioxin/furan, a ubiquitous mixture of chemicals, on downwind Port Angeles properties.

   Recommendations: An appropriate number of area background samples should be collected and used to help evaluate whether the mill affected downwind properties.

6. **Section 3.2, Chemical Analytes** - Gasoline to oil range petroleum products were used or stored at a number of areas at the site. However, only NWTPH-Dx, an analytical method for determining diesel to oil range contaminant concentrations, is proposed for groundwater sampling.

   Recommendation: Groundwater samples should also be analyzed using NWTPH-Gx to determine if gasoline is also a possible groundwater contaminant.

7. **Section 5.5.3, Groundwater Sample Collection** - Monitoring wells will be sampled with submersible Grundfos (or equivalent) pumps using low flow sampling techniques. Submersible pumps are water-cooled and can significantly raise groundwater sample temperatures when operated at low flows, potentially resulting in the loss of volatile chemicals.

Recommendation: Groundwater sample temperatures and flow rates should be closely monitored and recorded throughout the sampling to ensure that representative groundwater samples are collected.

Quality Assurance Project Plan (QAPP)

1. **Tables 3-2 to 3-5**: Analytical reporting limits for each chemical in each media are provided in the tables. Typically, these values are compared to corresponding cleanup levels so that it can be determined whether appropriate analyses have been selected. However, no cleanup levels are provided in the QAPP. Consequently, it cannot be determined whether the proposed methods are adequate.

Child Health Initiative

Children could be exposed to contaminants associated with the Rayonier Mill site, particularly in downwind non-industrial areas. Because children can be uniquely vulnerable to hazardous effects of environmental contaminants, DOH will consider childhood exposures when evaluating data for this site

Conclusions

Some of the proposed sampling and analysis described in the *Management Plans for the Remedial Investigation-Feasibility Study of the Upland Environment, Former Rayonier Pulp Mill, Port Angeles, Washington* requires modification to support evaluation of exposure pathways and the potential human health effects associated with the site.

Recommendations/Action Plan

The following recommendations summarize those presented and discussed above:

- Reporting limits for historic data should not be ignored in the selection of chemicals of concern, particularly for those chemicals that are likely site contaminants (e.g., dioxin/furans, PCBs).
- The rationale for some of the proposed sampling and analysis needs to be clarified.
- All completed and potential exposure pathways and receptors should be identified.
- Sampling locations and methods that will result in representative samples should be selected.

Action

The remedial investigation should be modified to include DOH's recommendations.

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3. Rayonier Incorporated. Proposed schedule and activities, remedial investigation/feasibility study, uplands operable unit, former Rayonier Pulp Mill, Port Angeles, Washington. 2003 Jan 3.

Certification

This Health Consultation was prepared by the Washington State Department of Health under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the health consultation was begun.

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The Division of Health Assessment and Consultation, ATSDR, has reviewed this public health consultation and concurs with the findings.

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